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imperfect aeration does not occur under conditions of normal respiration. It was at first assumed that alcohol was an intermediate product in normal respiration, but did not accumulate because it was utilized as soon as formed. Later, GODLEWSKI suggested that the alcohol produced under anaerobic conditions is a secondary product which does not occur among the intermediate products of respiration under normal conditions. With a view of throwing some light on this problem, ZALESKI⁶ investigated the utilization of alcohol by higher plants. Etiolated seedlings of *Vicia Faba* and *Lupinus albus* and seeds of *Medicago* and wheat were floated for 24-48 hours in solutions containing 1 per cent of alcohol, or were kept for a time under anaerobic conditions. Thereupon, the alcohol was determined in one portion of the plants immediately and in the other after 24 hours, during which loss of alcohol by evaporation was prevented. The experiments showed that 27-72 per cent of the absorbed alcohol disappeared from the plants in the course of 24 hours. These experiments show that higher plants are capable of oxidizing alcohol when it is present in their tissues, but, as the author points out, it does not necessarily follow that alcohol is actually an intermediate product in normal respiration.—H. HASSELBRING.

Multinucleate cells.—The occasional occurrence of multinucleate cells in the higher plants is well known, but recent investigations indicate that it may be a very common phenomenon. BEER and Mrs. ARBER⁷ have been making an extensive study of the subject, and have concluded that in the cortical and medullary parenchyma of stems there is a stage between the meristematic and mature conditions in which each cell characteristically contains more than one nucleus. This stage may be prolonged, or it may be so brief as to be easily overlooked. They are inclined to believe that this binucleate or multinucleate phase may be a universal phenomenon.

Miss PRANKERD⁸ has investigated a wide range of forms, and finds that such cells (usually binucleate) occur in different tissues of various young organs, and suggests that their occurrence is characteristic of regions of active growth. In some cases these nuclei are probably produced by amitosis, followed by wall formation, and it is maintained that these processes are a means of tissue formation in rapidly growing organs.—J. M. C.

Phylogeny of Filicales.—In continuing his studies of the phylogeny of Filicales, BOWER⁹ has investigated *Cheiropleuria bicuspis*, a monotypic fern

⁶ ZALESKI, W., Über die Alkoholoxydation durch die Samenpflanzen. Biochem. Zeitschr. 69:289-293. 1915.

⁷ BEER, RUDOLF, and ARBER, AGNES, On the occurrence of binucleate and multinucleate cells in growing tissues. Ann. Botany 29:597, 598. 1915.

⁸ PRANKERD, T. L., Notes on the occurrence of multinucleate cells. Ann. Botany 29:599-604. figs. 8. 1915.

⁹ BOWER, F. O., Studies in the phylogeny of the Filicales. V. *Cheiropleuria bicuspis* (Bl.) Presl, and certain other related ferns. Ann. Botany 29:495-529. pls. 24, 25. 1915.